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AUTHOR INDEX

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Accomazzo, M.A., Quantitative Count Calibration of Light Scattering Particle Counters, No. 4, p. 23. *(Abstract—see Peacock, S.L.)*

B

Barengoltz, J., Calculating the Obscuration Ratio Due to Particle Surface Contamination, No. 6, p. 36. *Measurement of surface cleanliness for optical and spacecraft elements in terms of obscuration ratio is described. A useful method for the calculation of the obscuration ratio for particle distributions assumed to follow a generalized MIL-STD-1246A form is presented. In addition, the validity of an estimation method for measured, discrete distributions is established by the derivation of upper and lower bounds on the desired quantity.* (CC Criteria and Standards, Identification and Measurement)
Barris, M.A., Filter Media Design for High Purity Air Applications, No. 4, p. 27. *(Abstract—see Schaefer, J.W.)*
Blythe, D.M., The Impact of Burn-In on IC Reliability, No. 1, p. 19. *(Abstract—see Denton, D.L.)*
Breiner, E.M., Low Level Radioactive Waste Disposal—Technology and Public Policy, No. 4, p. 47. *An overview of low level radioactive waste (LLRW) disposal technology and associated public opinion and policy. Safe disposal technology is available but hindered by lack of public acceptance.* (EE Environmental Planning, Solid and Hazardous Waste Management, Water Quality Impact)
Brinkman, P.W., Cost Estimation of Solar Simulation Facilities in Europe, No. 6, p. 33. *A parametric model is presented which provides ROM (Rough Order Magnitude) cost estimates for space simulation facilities, with a beam diameter of up to 6 meters (19.7 ft). The model is based on cost figures of existing European test facilities and shows cost to be proportional to beam size.* (DTE Solar and Space Simulation)
Burkhard, A.H., Evolution of Emerging Environmental Testing and Evaluation Techniques, No. 2, p. 38. *Discusses statistically-based environmental test and evaluation techniques used to develop and qualify electronic systems with much higher levels of reliability than current systems. Defects are described as nucleating points of failures in support of a fracture mechanics approach to achieving equipment reliability. This approach is tied to environmental stress screening and test, analyze, and fix strategies. A blend of analytical and physical testing is advocated.* (DTE Criteria and Standards, Test Tailoring; PR Acquisition Policies)
Burrow, S.W., Proposed Tests for Clean Room Swabs, No. 5, p. 37. *Discusses tests proposed for measuring swab characteristics identified as critical in cleanrooms. Available cleanroom swabs, typical cleanroom applications, and swab requirements are discussed. Proposed test methods are presented for a variety of characteristics.* (CC Clean Room Design/Materials, Identification and Measurement)

C

Caruso, H.J., The Cost Impact of MIL-STD-810D, No. 4, p. 41. *The cost implication of applying MIL-STD-810D to environmental test programs is examined. Method by method comparison shows little systematic impact to existing facilities for most methods. Misapplication of the document can greatly increase the facility impact. Test durations are compared and shown to have minor impact on test schedules in most cases. Up-front costs for environmental engineering are offset by savings in redesign and retest costs.* (DTE Acoustics, Criteria and Standards, Solar and Space Simulation, Climatics and Thermal, Shock and Vibration; PR Acquisition Policies)
Cooper, D.W., Rationale for Proposed Revisions to Federal Standard 209B (Cleanrooms), No. 2, p. 25. *Discusses the rationale behind the proposed revisions of Federal Standard 209B on cleanroom air cleanliness classifications. Included are the additions of Classes 1 and 10, new classification conventions, sampling strategies and measurements, and particle counting instrumentation requirements and class limit criteria.* (CC Clean Room Design/Materials, Criteria and Standards, Identification and Measurement)
Cutler, F.M., Anion Analysis of High Purity Water, No. 1, p. 44. *Explores semiconductor, power, and pharmaceutical industries needs for ultra-high purity water for process control and associated problems in maintaining and monitoring process water quality. Discusses ion chromatographic (IC) techniques to identify contaminants; summarizes sample collection and conditioning methods; and identifies potential interferences. The relationships between conductivity, acid conductivity and level of ionic contamination are presented.* (CC Identification and Measurement)

D

Dahneke, B., A Method for Cross Calibrating Particle Counters, No. 5, p. 31. *Describes a system for generating particulate air contamination standards of known size distribution and concentration that was developed and used to determine the accuracy of several optical particle counters (OPCs) for the measurement of particulate air contamination. Instrument variability of a factor of six or more was found when using manufacturer's calibration data compared with less than 10% using the method described.* (CC Criteria and Standards, Identification and Measurement)

Denton, D.L., The Impact of Burn-In on IC Reliability, No. 1, p. 19. *An examination of the considerations involved in deciding whether burn-in is required for integrated circuits. In-house failure rate studies of plastic integrated circuits and associated reliability trends are presented and used as examples for break-even cost analyses. Basic computer programs are presented for estimating IC burn-in cost and failure rate improvements.* (PR Criteria and Standards, Stress Screening)

Donovan, R.P., An Experimental Study of Particle Emissions From Cleanroom Papers, No. 6, p. 38. *Six types of paper, four of which are "cleanroom" papers and two of which are conventional bond papers, were evaluated for aerosol particle emissions in the Texwipe modified flex tester. Under this type of stress, all cleanroom papers emitted significantly fewer particles than the bond papers. Significant differences also existed among the samples of the four cleanroom papers.* (CC Clean Room Design/Materials, Identification and Measurement, Sources and Effects)

F

Favour, J.D., Design and Control of a High Velocity, High Force Hydraulic Shock Test Machine, No. 2, p. 54. *Discusses the design and control of a large hydraulic shock testing device capable of peak velocities of 10.2 m/s (400 in/sec) and peak forces of 801 kN (180,000 lbs). Presents the major challenges of concept design, specification and procurement of two very large (2500 gpm) electro-hydraulic servovalves and the failsafe control of the servovalves and system response.* (DTE Shock and Vibration)

Feiler, A.M., Managing Project Technical, Cost and Schedule Risks, No. 6, p. 17. *(Abstract—see Geminder, R.)*

Fickel, L.M., An Experimental Study of Particle Emissions From Cleanroom Papers, No. 6, p. 38. *(Abstract—see Donovan, R.P.)*

Frey, A.H., Reduction of Formaldehyde, Ammonia, SO_2, and CO_2 Concentrations in Room Air, No. 4, p. 57. *Presents analyses indicating that complex electrical fields can modify perceived odor and particulate distribution. Discusses a complementary experiment undertaken to evaluate the influence of in-duct complex electrical fields on concentrations of formaldehyde, ammonia, sulphur dioxide, and carbon dioxide gases.* (CC Filters and Filtration, Identification and Measurement; EE Air Quality Impact)

G

Geldreich, E.E., Control of Microorganisms of Public Health Concern in Water, No. 2, p. 34. *Examines the microbial barrier approach used to control the microorganisms of public health concern in water. Discusses how these can be controlled by careful management of a series of barriers, including natural and human engineered, in waste water and water supply treatment.* (EE Environmental Planning, Water Quality Impact)

Geminder, R., Managing Project Technical, Cost and Schedule Risks, No. 6, p. 17. *An innovative technique for managing project risks in the aerospace and defense industry, that has been used on over 100 projects, is developed in this paper. The technique is, in effect, a "second generation PERT" that accounts for, and deals with the many uncertainties that impact project schedule, resource and cost performance. Included are factors such as: specification uncertainties; design, material and process uncertainties; escalation of cost factors; availability of qualified contractors and specialized equipment; contractor productivity; timeliness of material, equipment, and information deliveries; transportation and logistics support; environmental factors; rejects, rework and other delays due to quality of materials and products; and, mechanical breakdown and malfunctions during system/component testing and commissioning.* (PR Acquisition Policies; CA Environmental Modelling/Analysis)

Grant, D.C., Quantitative Count Calibration of Light Scattering Particle Counters, No. 4, p. 23. *(Abstract—see Peacock, S.L.)*

H

Harned, W., Bacteria as a Particle Source in Wafer Processing Equipment, No. 3, p. 32. *Examines bacteria in deionized water as a contaminating particulate source in wafer processing equipment. Solutions to controlling bacteria by monitoring, point-of-use sanitization, new equipment design and facility modifications, and vendor/customer interaction are presented.* (CC Filters and Filtration, Sources and Effects)

Harris, A.P., A Method for Predicting Results of Humidity Tests, No. 6, p. 22. *A method for predicting the results of humidity tests applied to electronic equipments is presented based on a theory of vapor entry into parts to cause failure. The mechanisms are diffusion through materials, diffusion through small holes and flow through relatively large holes, the predominant mechanism depending on the protective packaging. The method provides an estimate of the probability similar in principle and with an accuracy comparable to the reliability prediction methods of MIL-HDBKD-217. Examples of prediction and references are given.* (DTE Climatics and Thermal, Criteria and Standards)

Hinga, S., Transportation Environments of Fresh Produce, No. 3, p. 19. *(Abstract—see Peleg, K.)*

Hoolihan, D.D., A Status Report Relative to a Standardized Test Method for Electrostatic Discharge (ESD), No. 3, p. 35. *Addresses the problems associated with developing a standardized test method for ESD. An overview of ESD and its effects on electronic hardware is presented. ANSI, ECMA, IEC, EIA, and NEMA ESD Standards are examined.* (CC Criteria and Standards, Sources and Effects; DTE Criteria and Standards)

J

Johnson, B., A Method for Cross Calibrating Particle Counters, No. 5, p. 31. *(Abstract—see Dahneke, B.)*

Jones, M.C., Shock Simulation and Testing in Weapons Development, No. 5, p. 17. *Relatively simple air gun techniques are presented as a means of realistically simulating shock/transient loading events for weapon systems. Air gun principles and developments are reviewed. Applications to rocket motor signature, ejection, flight retardation load, and impact and penetration simulations are summarized.* (CA Digital Data Measurement/Processing; DTE Shock and Vibration)

K

Keilson, S.E., Work Area Characterization to Control Product Cleanliness, No. 2, p. 29. *Presents the particulate contamination characterization program for the NASA Hubble Space Telescope cleanroom facility. An analytical model to predict obscuration data for hardware exposed to typical cleanroom environments was developed. A performance profile of the work area was derived from real-time experimental data and related the effectiveness of the facility design to operational manpower and activity loading. The three-dimensional and time dynamics of this clean room environment were considered.* (CA Environmental Modelling/Analysis, Environmental Control/Monitoring; CC Clean Room Design/Materials, Criteria and Standards, Identification and Measurement)

Evaluating Clean Room Products for Aerospace Applications, No. 4, p. 19. *Presents essential guidelines for evaluating cleanroom products such as garments, gloves and wipers, for large aerospace assemblies. Compatability and durability compromises are discussed, along with difficulties of balancing molecular, particulate, human comfort, and usage criteria. Solvent compatibility and contact transfer laboratory test results are reported.* (CC Clean Room Design/Materials, Criteria and Standards, Identification and Measurement)

L

Larson, C.O., Keynote Address at the National Conference and Workshop on Environmental Stress Screening of Electronic Parts, October 1985, No. 4, p. 32. *Discusses environmental stress screening of torpedoes by focusing on two related intensive-care programs; the Product Improvement Program (PIP), and the Defect Reduction Program. Results of stress screening at lower assembly and piece part levels are also examined.* (PR Acquisition Policies, Criteria and Standards, Stress Screening)

Ligtenberg, A., Advantages of Facilities Monitoring System in Integrated Circuit Fabrication, No. 6, p. 41. *This paper discusses a computerized Facilities Monitor and Control system, in use at Hewlett Packard's Cupertino Integrated Circuit Division. Over 350 transducers monitor deionized (DI) water, process gases, process environment, cleanroom equipment and environment, as well as ensure industrial hygiene, safety and environmental compliance. Examples illustrate how the system improves yield, diagnoses process control problems, prevents contamination and improves the facilities, resulting in significant cost savings. This is accomplished by continuous real-time monitoring, historical data acquisition and analysis, trend-lining, correlation studies and alarm notification.* (CA Environmental Control/Monitoring; CC Clean Room Design/Materials, Identification and Measurement)

Liu, B.Y.H., Filter Media Design for High Purity Air Applications, No. 4, p. 27. *(Abstract—see Schaefer, J.W.)*

M

Michaels, L., An Experimental Study of Particle Emissions From Cleanroom Papers, No. 6, p. 38. *(Abstract—see Donovan, R.P.)*

Mc

McClellan, M.S., Monitoring Contamination and Component Cleaning for the Hubble Space Telescope, No. 1, p. 41. *Discusses the rationale for a large aerospace project to monitor airborne particulates and hydrocarbon levels in assembly facilities, to perform quantitative analyses of resultant fallout, and to assess its influence on system performance. In addition, a cleaning process is detailed with primary consideration given to materials configuration, options for solvent selection, cleaning techniques and cleanliness verification.* (CC Identification and Measurement)

P

Patrick, W.C., Operational and Technical Results From the Spent Fuel Test—Climax, No. 1, p. 51. *A demonstration of the technical feasibility of short-term storage and retrieval of spent nuclear fuel assemblies in deep geologic storage at the U.S. Department of Energy Nevada Test Site (NTS). Handling systems and procedures developed to emplace eleven intact spent-fuel assemblies and retrieve them three years later are described. Technical data show that the mechanical and thermal properties of granites are compatible with nuclear waste isolation objectives. Measured and calculated temperatures are in excellent agreement. Radiation transport calculations exceeded the accuracy of available long-term dosimetry techniques used on the test. Good agreement was found between measured and calculated displacements within the rock mass.* (CA Environmental Modelling/Analysis; EE Solid and Hazardous Waste Management)

Peacock, S.L., Quantitative Count Calibration of Light Scattering Particle Counters, No. 4, p. 23. *Presents a precise calibration technique to generate count calibration data for light-scattering instruments used to monitor particle levels. The technique uses Polystyrene latex (PSL) spheres as a primary challenge source and SEM techniques to compare actual challenge levels to instrument responses. This technique is useful for calibration of both liquid and aerosol optical particle counters. Liquid count calibration data are presented.* (CC Identification and Measurement)

Peck, R.D., The Proposed Revision of Federal Standard 209B, No. 5, p. 42. *Examines the proposed revisions being recommended to the General Services Administration by the RP50 Committee of the Institute of Environmental Sciences designed to update the standard to the present state-of-the-art in cleanroom technology. Topics discussed include scope, limitations, definitions, class determination, monitoring, sampling, particle counting methods, and statistical requirements.* (CC Clean Room Design/Materials, Criteria and Standards, Identification and Measurement)

Peeters, W.A., Cost Estimation of Solar Simulation Facilities in Europe, No. 6, p. 33. *(Abstract—see Brinkman, P.W.)*

Peleg, K., Transportation Environments of Fresh Produce, No. 3, p. 19. *Examines a produce distribution survey conducted to develop a calculated risk approach to package systems design. A database for simulating shock and vibration inputs derived from two instrumented surveys of typical transport routes of apples and citrus fruit is discussed. Spectral envelopes for vibration on different truck types, road conditions, and a ship voyage are included. Handling shocks sustained by pallet loads during forklift loading and unloading are also reported.* (CA Environmental Modelling/Analysis, Digital Data Measurement/Processing; DTE Criteria and Standards, Shock and Vibration)

Pennington, D.R., Environmental Stress Screening—Some Misconceptions, No. 3, p. 26. *Addresses misconceptions hindering the implementation of a viable ESS program within the shipbuilding industry by providing an understanding of the objectives and advantages of a cost-effective ESS program. Discussion topics include applicability to already fielded equipment, survivability of good hardware, cost savings, ESS vs burn-in, and improperly established ESS parameters.* (PR Acquisition Policies, Criteria and Standards, Stress Screening)

Perlstein, H.J., The Quality of Military Grade Electronic Parts, No. 2, p. 43. Describes the results and cost effectiveness of a long-term parts screening program. *Active parts described include digital and linear integrated circuits, transistors, diodes, and hybrids. Passive devices described include capacitors, resistors, magnetics, filters, connectors, rotating components, relays and switches. Simple mechanical devices and printed circuit boards are also described.* (PR Stress Screening)

R

Ried, R.C., A Flight Test Challenge: Aeroassist for Reuseable, Space-Based Transportation, No. 5, p. 26. *Examines the challenge of developing reuseable, space-based transportation systems which can take advantage of aerobraking to achieve greater performance and overall efficiency. Contends that current and future challenges, coupled with technology advances, dictate reliance on productive combinations of testing and analysis.* (CA Environmental Modelling/Analysis; DTE Test Tailoring, Solar and Space Simulation)

Roberts, W.B., Derivation of External Store Vibration Test Spectra From Flight Data, No. 5, p. 22. *Discusses the acquisition and subsequent reduction of vibration data from instrumented air-craft-carried weapon systems. In-flight measured data from externally carried stores flown on several different host aircraft is presented and compared with standard vibration test levels. The correlation between overall grms levels and dynamic pressure is shown.* (CA Digital Data Measurement/Processing; DTE Criteria and Standards, Shock and Vibration, Test Tailoring)

S

Schaefer, J.W., Filter Media Design for High Purity Air Applications, No. 4, p. 27. *The design of high performance filter media for HEPA and ULPA applications is examined comparing theoretical predictions with experimental data. Pressure drop and particle collection efficiency are examined as functions of particle diameter, velocity, and media geometry. Filter media are characterized and tested for particle sizes at typical media rating and application velocities. Filter media performance comparisons show how the point of minimum efficiency can be altered by velocity and media geometry changes. Filter media design, analysis, evaluation and application tools are presented for optimizing high performance filter media for HEPA applications.* (CC Filters and Filtration, Identification and Measurement)

Schafer, H.C., Vital Precautions for Fungus Testing, No. 1, p. 27. *A first-person account of what did go wrong while working in an uncontrolled Aspergillus-laden atmosphere, and a list of commonsense precautions are presented. Also, discussed are the physiological effects and symptoms associated with Aspergillosis.* (DTE Climatics and Thermal)

Environmental Criteria as Cost Drivers, No. 3, p. 30. *Presents two case histories, one dealing with lubricants and one with jet fuels, to show the impact of missing or misapplied environmental criteria. Increased program costs and reduced equipment or materiel availability are highlighted as penalties.* (DTE Criteria and Standards, Climatics and Thermal; PR Acquisition Policies)

Scialdone, J.J., Screening and Tests of Materials for Space Applications, No. 1, p. 24. *Examines the outgassing properties of materials and other considerations on materials acceptance for space applications. Uses of outgassing data for evaluating important performance characteristics of a space system are indicated. ASTM-E595-77 deficiencies and advantages and materials acceptance criteria are discussed. Advantages for materials selection and uses of data provided by long-term measurements of outgassing rates and surface reemission of materials are presented.* (CC Criteria and Standards, Identification and Measurement; DTE Criteria and Standards, Solar and Space Simulation)

Optimization of Outgassing Bake-Out Temperatures and Duration of Space Systems, No. 4, p. 38. *Discusses the procedure in which spacecraft systems are baked under vacuum to remove occluded and absorbed gases, solvents, plasticizers, and other materials acquired during their manufacture and exposure to the environment. This procedure reduces outgassing during subsequent vacuum exposure, decreases potential contaminants which may deposit on critical surfaces, and limits the gaseous environment induced by the spacecraft outgassing. Guidelines are presented to determine bake duration based on maximum acceptable bake temperature or material outgassing properties.* (CC Identification and Measurement; DTE Solar and Space Simulation)

Spangle, W.E., Pre-Earthquake Planning for Post-Earthquake Rebuilding (PEPPER), No. 2, p. 49. *Describes results of research in process on the feasibility of Pre-Earthquake Planning for Post-Earthquake Rebuilding (PEPPER). Considerations include probability of earthquake and earthquake scenarios and estimates of associated structural damage. A process for reducing disaster impact is outlined.* (CA Environmental Modelling/Analysis; DTE Shock and Vibration; EE Environmental Planning)

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Tijerina, V., Proposed Tests for Clean Room Swabs, No. 5, p. 37. *(Abstract—see Burrow, S.W.)*

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Weingartner, C.E., Vacuum Baking of Shuttle/Centaur Components, No. 2, p. 46. *Reviews the tests, equipment requirements, sensor instrumentation, and results to date of a test program designed* to measure outgassing and condensation rates of nonmetallic *components for the Shuttle/Centaur.* (CC Criteria and Standards, Sources and Effects; DTE Solar and Space Simulation)

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